IN RESPONSE TO THE NIGHTTIME IBOC PROPOSAL (FCC Docket 99-325)
filed by Eric S. Bueneman, Amateur Radio Station N0UIH
Hazelwood, Missouri

Background

I am a licensed Amateur Radio Operator (call sign N0UIH) who is very opposed to the implementation of In-Band, On-Channel Digital Audio Broadcasting (IBOC-DAB), not only on the AM broadcast band, but also on the FM band. IBOC will desecrate the AM and FM bands, and practically destroy the integrity of the aforementioned bands. In addition, no digital radio broadcasting, with the sole exception of digital television (DTV), should be allowed on all frequencies below 1 GHz (or 1000 MHz). IBOC-DAB is the most spectrally inefficient of all technologies ever conceived; wasting as much as 100 kHz of valuable AM spectrum space; it also wastes valuable FM spectrum space. In addition, IBOC would prove devastating to the radio industry as a whole; robbing this country of literally hundreds of independent radio stations, which more people are depending on for quality programming. Numerous markets will lose multiple signals if the FCC recklessly recommends 24-hour implementation of IBOC on the AM broadcast band. It would also be a disaster for consumers; many of whom cannot afford the high price of IBOC receivers.

The Proven Spectral Inefficiency of IBOC

It has been proven that IBOC-DAB is spectrally inefficient, especially on the AM broadcast band. The nighttime IBOC tests in late 2002 were disastrous. At my monitoring location in Hazelwood, MO, the nighttime IBOC tests of WLW (700 kHz) Cincinnati, OH were noted. The station's IBOC sidebands caused major interference to KSTL (690 kHz) St. Louis, MO (18 watts); even to the station's AM Stereo pilot tone. WLW's IBOC sidebands were strong enough to prevent any signals to be received on 710 kHz, and also interfered with stations on 680 kHz and WGN on 720 kHz. The interference was monitored using a 1986-vintage Realistic TM-152 C-QUAM AM Stereo tuner and a General Electric Superadio III. IBOC's spectral inefficiency is the primary reason why it not only shouldn't be implemented during nighttime hours, but should not be implemented on AM or FM, period. In addition, the use of IBOC or any other digital radio system on the AM, FM or shortwave bands will also pose a threat of interference to Amateur Radio interests; IBOC transmissions on harmonic frequencies could interfere with vital Amateur Radio services. The FCC should also reject other proposed digital radio systems, such as the internationally-developed DRM (Digital Radio Mondiale) system on AM and the shortwave broadcast bands; no digital audio broadcasting should ever be permitted below 1 GHz. The AM and FM broadcast bands, as well as the international shortwave bands, are not suited for digital radio. Therefore, AM, FM and shortwave radio cannot, and should not, go digital under any circumstances.

An Example of Inefficiency: IBOC Interference in the St. Louis Area

Another example of the spectral inefficiency of IBOC can be demonstrated by the use of the system on KFUO (850 kHz), licensed to Clayton, MO. The station, owned by

the Lutheran Church-Missouri Synod, has been broadcasting IBOC since the summer of 2003. From the same Hazelwood location, using the same General Electric Superadio III and Realistic TM-152, I was able to do a bandscan of the 800 to 900 kHz portion of the AM broadcast band. The bandscan of this portion of the AM broadcast band with KFUO in analog mode during daylight hours is noted below.

kHz	Station heard (signal strength)
800	KREI Farmington, MO (clear)
810	WHB Kansas City, MO (clear)
820	WCSN Chicago, IL (weak)
830	KOTC Kennett, MO (fair in Stereo)
840	Wiped out by KFUO's analog sidebands
850	KFUO has excellent sound quality; approaching FM standards
860	Wiped out by KFUO's analog sidebands
870	WINU Shelbyville, IL (weak)
880	WCBW Highland, IL (clear)
890	WLS Chicago, IL (good)
900	KFAL Fulton, MO (clear)

Now, let's contrast the above bandscan with the same portion of the AM band during daylight hours, while KFUO is operating in IBOC mode.

kHz	Station heard (signal strength)
800	KREI Farmington, MO (clear)
810	WHB Kansas City, MO (with moderate interference from KFUO's IBOC sidebands)
820	Wiped out by KFUO's IBOC sidebands
830	Wiped out by KFUO's IBOC sidebands
840	Wiped out by KFUO's IBOC sidebands
850	KFUO's sound quality suffers; it's very tinny, at best
860	Wiped out by KFUO's IBOC sidebands
870	Wiped out by KFUO's IBOC sidebands
880	WCBW Highland, IL (with severe interference from KFUO's IBOC sidebands)
890	WLS Chicago, IL (very poor with interference from KFUO's IBOC sidebands)
900	KFAL Fulton, MO (clear)

IBOC-DAB is even more inefficient at close range. Using a Jensen CD3010X in-dash, aftermarket car radio at a location in the 7700 block of Clayton Road in Richmond Heights, MO, one mile from KFUO's transmitter site, the contrast between analog-only and the use of IBOC on KFUO's signal is even more marked. Below is the analog-only bandscan of the 800 to 900 kHz portion of the AM broadcast band during daylight hours.

kHz	Station heard (signal strength)
800	KREI Farmington, MO (clear)
810	WHB Kansas City, MO (clear)
820	Image from KFUO
830	KOTC Kennett, MO (fair)
840	Wiped out by KFUO's analog sidebands
850	KFUO with excellent audio quality; approaching FM standards
860	Wiped out by KFUO's analog sidebands
870	Wiped out by KFUO's analog sidebands
880	WCBW Highland, IL (clear)
890	WLS Chicago, IL (fair)

900 KFAL Fulton, MO (fair)

Now, let's contrast this bandscan with the same portion of the AM broadcast band while KFUO is operating with IBOC from the same location.

kHz	Station heard (signal strength)
800	KREI Farmington, MO (with moderate interference from KFUO's IBOC sidebands)
810	Wiped out by KFUO's IBOC sidebands
820	Wiped out by KFUO's IBOC sidebands
830	Wiped out by KFUO's IBOC sidebands
840	Wiped out by KFUO's IBOC sidebands
850	KFUO's sound quality suffers; tinny at best
860	Wiped out by KFUO's IBOC sidebands
870	Wiped out by KFUO's IBOC sidebands
880	WCBW Highland, IL (nearly inaudible due to KFUO's IBOC sidebands)
890	Wiped out by KFUO's IBOC sidebands
900	KFAL Fultion, MO (with severe interference from KFUO's IBOC sidebands)

WCBW is operated as a ministry outreach; the station is owned by the New Life Evangelistic Center of St. Louis. Not only does WCBW provide a ministry outreach for the St. Louis metropolitan area, but it also serves as a training ground for new broadcast workers and for new air talent for Christian radio. The use of IBOC on KFUO's 850 kHz frequency impairs the ability of WCBW's 880 kHz frequency to be an effective ministry outreach for the St. Louis area.

These bandscans prove that it would be reckless for the FCC to consider implementing IBOC-DAB at any time of day or night. This proves the spectral inefficiency of the IBOC system put forth by iBiquity; therefore, it would be in the best interests of the radio industry that iBiquity's IBOC-DAB system not be implemented. The FCC would be doing the industry a favor by withdrawing type acceptance for iBiquity's system, and permanently banning all digital audio broadcasting below 1 GHz.

What Would Happen in St. Louis If IBOC Were Implemented?

The St. Louis market, presently populated with 61 stations, would lose 42 of those stations if IBOC were to be implemented, as the FCC suggests. On the AM band, only one station would remain on the air if IBOC were to be implemented: KMOX (1120 kHz), a 24-hour, 50,000-watt non-directional station, licensed to St. Louis, MO, owned and operated by Infinity Broadcasting, a division of Viacom. The market would lose all of its sources for niche programming, such as free-form talk, Oldies from the 1950s and 1960s, Rhythm and Blues Oldies (Classic Soul), and various Christian formats. On the non-commercial portion of the FM band, only three radio stations would remain on the air: KDHX (88.1 MHz), owned and operated by Double Helix, Inc.; KWMU (90.7 MHz), owned and operated by the University of Missouri, and KSIV-FM (91.5 MHz), owned and operated by Bott Broadcasting Company (all licensed to St. Louis, MO). St. Louis would lose sources for mainstream Jazz, Alternative Rock, and even some forms of Christian music. In addition, the coverage of one other station, WIBI (91.1 MHz), licensed to Carlinville, IL, would be greatly reduced. In analog mode, WIBI's signal easily reaches much of the St. Louis metropolitan area; if WIBI had to switch to IBOC,

the station's signal would not be able to get into Litchfield. On the commercial portion of the FM band, seven stations would be forced off the air (mostly Class A and B1/C3 stations); in addition, one Class B (WSMI-FM Litchfield, IL, 106.1 MHz) and one Class C (KTJJ Farmington, MO, 98.5 MHz), both of which have signals that penetrate the St. Louis market in analog mode, would have their coverages greatly reduced. WSMI-FM's signal, if IBOC were ever implemented, would not make it to Carlinville; KTJJ wouldn't be heard outside St. Francois County, MO.

More and more people are depending on independent broadcasters, such as the aforementioned KTJJ and WSMI-FM, as well as KTRS (550 kHz) St. Louis, MO, WGNU (920 kHz) Granite City, IL and even non-commercial stations like WSIE (88.7 MHz) Edwardsville, IL and KCLC (89.1 MHz) St. Charles, MO for tangible, quality programming. Corporate-owned radio stations, especially those owned by the likes of Clear Channel Worldwide, have become havens for low-quality programming. These corporate interests have been known for disenfranchising entire groups of listeners (most notably the affluent 45-64 demographic), dumping quality local programming for deceptive voicetracked programming and satellite-fed programming, negative attitudes toward trying out new talent, and general dishonesty throughout the industry.

IBOC implementation would mean the loss of many of these independent voices; in addition, many college radio stations, the few training grounds left for new on-air talent, would be lost. The loss of these training grounds would mean the loss of a pool of fresh, new talent from which many commercial radio stations can draw from; the results would also be disastrous, as in the potential death of the radio industry as a whole.

No Market for IBOC Receivers

IBOC-DAB receivers will be priced out of the range of most American consumers. Now, who would want to pay upwards of $1,000 for a receiver that is designed to decode iBiquity's inferior system? The average American consumer will not shell out his or her hard-earned money to buy an inferior IBOC receiver, when present analog technologies like FM Stereo and C-QUAM AM Stereo are already capable of producing CD-quality sound. Motorola's latest receiver chip, the "Symphony" chip (which includes C-QUAM AM Stereo), will further improve the audio quality of analog transmissions. This chip would add only a few dollars to the cost of a receiver, while IBOC adds hundreds of dollars to the cost of a receiver. Most American consumers would prefer buying a less expensive, analog receiver with the new Motorola chip than an inferior IBOC receiver. The marketplace simply cannot support iBiquity's inferior system. The incompatibility of IBOC with present analog receivers means that many American consumers would be disenfranchised because of the extremely high price of IBOC receivers; unlike with other consumer products, the price of IBOC receivers will only go up, and will never come down. We're seeing that now with cable television rates. With over 500 million analog receivers in the U.S. marketplace (25 million of those capable of receiving AM Stereo, with such receivers continuing to be made), there is absolutely no market for IBOC receivers among the general public.

The only logical way for the FCC to go is the implementation of the proven Eureka 147 system, which is catching on in Europe, as the only acceptable system for digital audio broadcasting in the United States. In addition, the National Association of

Broadcasters should be forced to accept more competition. More competition would promote a healthier, more vibrant broadcast environment than the unhealthy, destructive environment which has been in place in the broadcast industry (especially the commercial end of the business) since the Telecommunications Act of 1996 went into effect. Less competition would be detrimental to the industry as a whole; it is very unhealthy and destructive. More competition would strengthen the radio industry.

Conclusion

The FCC would be acting in the best interests of the public if the Commission withdraws their endorsement of iBiquity's inferior IBOC system, and puts a permanent ban on digital audio broadcasting below 1 GHz. The spectral inefficiency of IBOC, as well as the incompatibility of digital radio with our current analog receivers, has already made IBOC obsolete. The Commission, by withdrawing their endorsement of IBOC, would also be able to protect Amateur Radio interests, and protect the integrity of the AM and FM broadcast service.

The National Association of Broadcasters and the Corporation for Public Broadcasting would best serve their interests by withdrawing its support for IBOC-DAB, and concentrate on improving analog broadcasting. The implementation of IBOC-DAB at night will increase harmful interference to smaller broadcasters; many of which are the only sources left for viewpoints independent of corporate control. Such interference would impair the ability of independent broadcasters to attract advertising revenue; in addition, it would impair Christian broadcasters' ability to reach out in ministry to the communities they serve.

The rejection of IBOC-DAB will be a shot in the arm for consumers, many of whom simply refuse to dole out their hard-earned money for a receiver designed to decode an inferior system. The rejection of IBOC will prevent a mass disenfranchisement of American radio listeners who do not have the financial means to purchase inferior IBOC receivers. This would pave the way for technologies which would improve analog radio, such as Motorola's "Symphony" chip. Getting rid of IBOC is in the best interests of American consumers and radio listeners.

It would also be logical for the FCC to adopt the proven Eureka 147 system for terrestrial digital audio broadcasting, allowing for more competition in the broadcast business. More competition would replace the current unhealthy environment in commercial broadcasting. In addition, the FCC would be acting in the best interests of the public by also banning the use of the DRM system on AM and shortwave stations in the United States, although Leonard Kahn's CAM-D system could be worth testing. If digital audio broadcasting is to succeed, then the U.S. must go along with the rest of the world, and endorse Eureka 147 now.